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EVALUATING AWARENESS TOWARDS EV: AN EXPLORATORY STUDY

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Abstract: A significant obstacle to the uptake of electric vehicles (EVs) is that consumers lack awareness and do not see them as viable options. A survey to analyze consumers' awareness of existing EVs was conducted toward existing EVs in Malaysia. The focus area is in Langkawi Island, where the place aims to be a low carbon Island by 2030. The understanding of the awareness of air pollution is essential to inform government approaches to addressing this issue. Thus, a comprehensive questionnaire survey has conducted with 506 respondents from Malaysian citizens. Data for this study comes from Malaysian citizens' over the period from August to September 2020 and conducting in Malay language.

Index Terms - Innovation, operation research, technology acceptance, electric vehicle.

1 Introduction

Towards climate change becoming unbearable, people worldwide are trying to find ways to mitigate environmental harm. The problem has generated by many environmental-friendly solutions to minimize human impacts on Earth, but how can we strive to be less harmful? In Malaysia, pollution is regulated by various environmental policies and legislation, including the 1974 Environmental Quality Act, subsidiary legislation such as the 2013 Malaysian Ambient Air Quality Standard, the 2014 Environmental Quality (Clean Air) Regulations. Despite this regulatory structure, Malaysia still has increased air pollution. As indicated by Inglehart (2020), the effectiveness of government efforts and initiatives aimed at addressing environmental concerns can only be accomplished by promoting people's environment. Consequently, government efforts to improve Malaysia's air quality would benefit from a deeper understanding of Malaysia's environmental protection awareness and support. Informing government responses to this issue is essential to be aware of air pollution and encourage environmental conservation.

Only a few public opinion studies, awareness, and attitudes towards air pollution exist, especially EVs (McElgunn, 2018). This study's reasons are that implementing any policy or law can not be effective without public awareness and support for protecting the environment by people and the government. More detailed insights from this study can help frame and develop the best policy options for this country and its citizens.

2 Background

There has been a general international trend towards high efficiency and renewable energy since the 1970s (McElgunn, 2018). Today, global climate change issues, rising sea levels, and air pollution are essential to the world. These issues have led to mega-environmental conferences such as the United Nations Climate Change Conference in Paris in 2015, where world leaders are increasingly present. The issues include finding ways to increase environmental effectiveness, meet new government standards, and meet the new requirements of an increasingly environmentally-aware consumer base are also discussed (McElgunn, 2018). World work to reduce the human-made impact on the Earth has resulted in investing in EVs in their fleet inventory for the automotive industry. Thus, Global leaders have agreed to fulfill new environmental and emission standards. In addition to the collective bargaining agreements, individual countries suggested adopting laws and grant subventions in order to build and increase the infrastructure and also sales for EV's (McElgunn, 2018).

For this study, the motivation of environmentally-awareness from consumers focused on transportation. This sector is select because most modes of transport have traditionally been heavily dependent on fossil fuels' consumption, which account for around 22% of the global emissions of carbon dioxide (Iea, 2012). As an alternative to lower carbon emissions, the chosen EVs will receive increased attention in the transport sector (Vassileva & Campillo, 2017). Thus, considering the urgent need to pursue efforts to combat climate change, nations have adopted various policies to promote EVS take-up (Adhikari et al., 2020). Also, policy instruments, however, are not consistent and vary from one country to another. As a result, market penetration of Evs is still low compared to Conventional Vehicles due to the various cost and non-cost factors (Yavuz et al., 2015).

In understanding the level of awareness toward EVs in Langkawi Island, it is essential to achieve the master plan 2030, which to be Langkawi Islands as a low carbon Island in the year. Besides, these issues also crucial to find what aspects affect consumer decisions. Thus, this study investigates the awareness towards EVs' existence at Langkawi Island. As a relatively new technology that has only started to become a mainstream product, it is essential to understand the level of consumer awareness of EVs to gather what aspects affect consumer decisions to adopt (McElgunn, 2018).

3 Method

A well-defined structured questionnaire to collect primary data samples with random stratified sampling using Google form. Thus, the hybrid scaled questionnaire was developed with 18 attributes. A hybrid means 5 points Likert, Binary scale (yes or No), and nominal. A research instrument has three significant sections. The first section belongs to seven demographic attributes. The second section belongs to the awareness of EVs with four attributes. The third section relates to EVs' interest with eight attributes. The implementation of this survey is between October and September 2020. The target population ware defined as people staying at

Langkawi Island and people who visited the Island before. This targeted people choose in order to find the awareness of existing EVs toward local people and tourists.

4 Analysis

For this study's aim, it will be beneficial to surveying people in Langkawi Island and who already visited it. The survey was conducted in Malay language from August to September 2020 is presented. This study's participants included 506 people from Malaysia were solicited to respond to this survey via google form, which is sent thru whatsup, telegram and emails. As shown below in Table 1, 358 respondents identified as female, 148 as male. The majority of participant age is between 18 to 30, which is 54.9%, followed by age 31-59 (42.5%), below 18 years (1.2%), and 60 years and above (1.4%). Almost employment of participants are working with the government and private sectors (36.4%), self-employed (26.7%), students (32%), unemployed (3%), and retired (2%). Base on this survey, for the monthly income range, 75.9% is the income less than RM3000. For RM3000 to RM6000 is 15.2%, followed by RM6000 to RM9000, 6.9% and above RM9000 is 2%. By observing education level, higher education level is 71.9% including degree and diploma holders, 19.2% from school level and 8.9% is postgraduate holders. Looking forward to analyzing the respondents staying at Langkawi Islands, 37.2% stay at Langkawi Island, and 62.8% are not. According to answer from not staying at Langkawi (318 participants), only 13.8% never visit Langkawi Island, the rest (86.2%) are Langkawi Island tourists.

Table 1: Demographic characteristics Data survey

Variable		(%)	Count
Gender	Male	29.2%	148
	Female	70.8%	358
Age	Below 18	1.2%	6
	18-30	54.9%	278
	31-59	42.5%	215
	60 and above	1.4%	7
Employment status	Working	36.4%	184
	Self-employed	26.7%	135
	Students	32%	162
	Unemployed	3%	15
	Retired	2%	10
Income range (RM)	<3000	75.9%	384
	3000-6000	15.2%	77
	6001-9000	6.9%	35
	>9000	2%	10
Education Level	Post-graduate	8.9%	45
	Higher education	71.9%	364
	School	19.2%	97
Staying at Langkawi Island	Yes	37.2%	188
	No	62.8%	318
Langkawi tourists	Yes	86.2%	274
	No	13.8%	44

Since this survey's main objective is to investigate EVs' awareness, the question "Is there an electric vehicle in Langkawi Island" is asked. The survey shows that 30.3% indicate "yes", 58.4% to "not sure" and 11.3% to "no" (Figure 1). From the results, almost 70% of the respondents do not know about the EV's existence in Langkawi. From the total respondents that aware of the existence of EV in Langkawi Island, most of the respondents know about the EVs thru friends and relatives (59.3%), followed by the internet (52.1%), TV and Radio (34.3% and 8.6% respectively), newspaper (15%), magazine (7.1%) and others (26.4%) as shown in Figure 2. These results show that the EV mostly can be obtained from informal sources such as by word of mouth and internet (media

social) platform. The formal platform such as TV, radio and newspaper/magazine shows less significant roles in disseminating the awareness about EV in Langkawi Island.

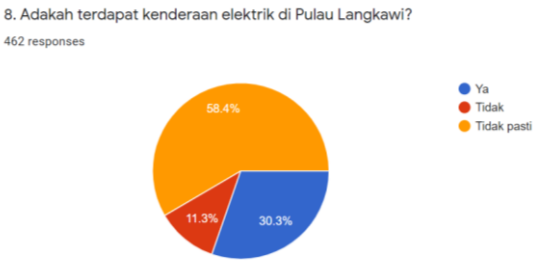

Figure 1: Is there an electric vehicle on the Island of Langkawi

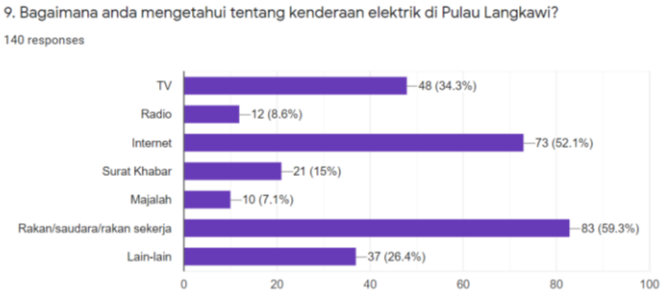

Figure 2: How do you know about electric vehicles in Langkawi Island? (multiple choice)

To further examining the awareness about the EVs in Langkawi Island, a question was asked to the respondents who claimed that they know about the existence of the EV in Langkawi Island. The respondents were asked about the type of EVs available on Langkawi Island. As shown in Figure 3, 63.6% of the respondents confident that EVs are available in Langkawi Island, while 30% are confident that there are electric motorcycle and bicycle in Langkawi Island. Furthermore, 14.3% of the respondents were thinks of the electric ferry, 9.3% for the electric buses, and 4.3% for the electric lorry; meanwhile, 26.4% of the respondents are not sure of what type of EV available in Pulau Langkawi. When the right answer for this question is only the electric car, this study reveals a shocking result which shows that at most, only 63.6% of the respondents (from 30.3% of the total respondents) who claimed to aware of the availability of EV in Langkawi Island truly knows about the existence of the EV. It can be assumed that those who claimed to know about EV is not getting the information about the EV themselves; instead, they might get the information from third parties or people close to them. This can be concluded that the awareness about the availability of EV in Langkawi Island is very low.

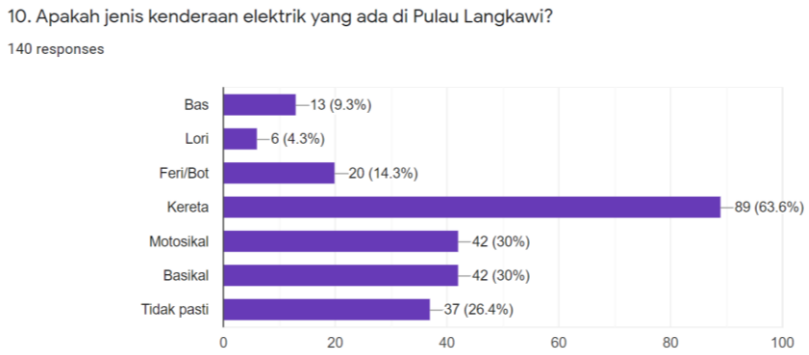

Figure 3: What types of EVs are available in Langkawi Island?

Towards understanding the awareness regarding the facility that supports the EV usage, most of the participants (60.7%) were not sure the area that facilitates the EV usage, while 31.4% confident that the area is Pantai Chenang 31.4%, followed by Kuah 13.6% and Padang Maksirat 9.3% (Figure 4). This shows that awareness about the facility is very low since the answer to this question is Pantai Chenang.

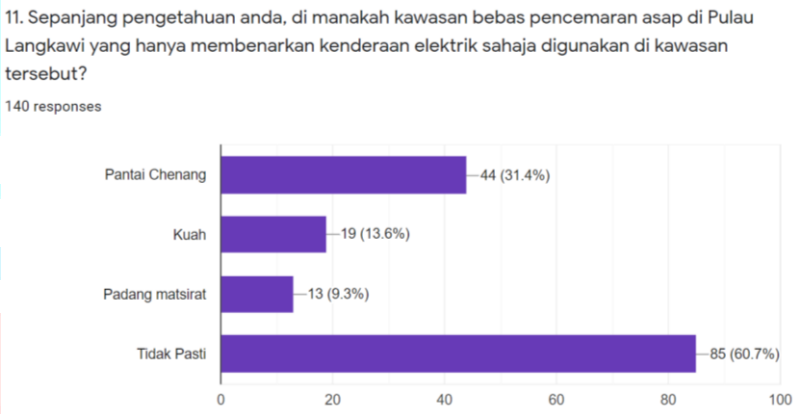

Figure 4: Q11 To the best of your knowledge, where is the smoke-free area on Langkawi Island that only allows electric vehicles to be used? (multiple choice)

5 Discussion

The aspiration to bring Langkawi Island toward a low carbon Island in 2030 is a good initiative introduced by the Malaysian government. It shows the government's full commitment to the world in achieving the agenda of a green environment. However, to achieve this mission, the government needs to get the full support from the people. In encouraging people to accept the use of EVs, awareness regarding the EV must be instilled. This is not limited to the awareness of the EV's existence and the technology and advantages in using EV.

This study shows that the awareness about the EV in Langkawi Island is still deficient. There are many factors can be related to the awareness level. One of the most important factors is the advertising strategy. This study shows that there are lacks of advertising strategy to promote the EV in Langkawi Island. Most of the locals and visitors at Langkawi Island have good knowledge about the EVs, but they almost found it through the informal channel, such as their relatives, friends, and the internet. Thus, the related agencies need to start to plan for more effective advertising strategies to introduce the EV to be aware of the EV and the zero-carbon agenda in Langkawi Island.

Moreover, this study shows a low level of awareness in terms of facility or infrastructure for EV usage. This can be due to less advertising strategy or a lack of availability of EV usage infrastructure. These can lead to low consumer acceptance and technology readiness among the user. As suggested, factors such as advertising, government support, infrastructure, technology, and consumer acceptance are critical to ensure that the implementation of EVs in Langkawi will come true, thus achieving the zero-carbon plan island 2030.

6 Future study

This survey still has several limitations, despite its rigorous design. For example, further refinements are required to categorize the survey sample. The study is conducted only by people from all over Malaysia. Therefore, applying this study's findings cautiously to other Malaysian groups with various educational backgrounds, professional qualifications, and other areas. To better understand this broader context, further national research is necessary.

Moreover, open-ended questions also need to be addressed to reveal new problems and deepen respondents' awareness about EVs in Langkawi Island. For instance, there are several reasons why survey participants are not aware of EVs, as discussed in this study. In the future, a study must be addressed in greater detail regarding awareness of EVs, which has mainly been descriptively analyzed because the clustered awareness elements lack internal consistency that cannot form a reliable scale. Further studies should consider adding more factors and testing in the Malaysian environment, especially in Langkawi Island, to achieve Malaysian Green Island 2030 success.

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